

AMENDMENT(S) TO THE SPECIFICATION

Please insert the following paragraph beginning at page 1, line 3::

CROSS REFERENCE TO RELATED APPLICATION

The present application is a 35 U.S.C. §§ 371 national phase conversion of PCT/EP2003/009508 filed 28 August 2003, which claims priority of German Application No. 102 43 020.9 filed 17 September 2002. The PCT International Application was published in the German language.

Please replace the paragraph beginning at page 1, line 4, with the following rewritten paragraph:

The present invention relates to a method for producing a spindle nut[[,]] ~~in particular of a~~ ball screw[[,]] and to a ball screw.

Please replace the paragraph beginning at page 1, line 7, with the following rewritten paragraph:

BACKGROUND OF THE INVENTION

DE 199 44 875 A1, for example, discloses a ball screw with a spindle and a nut surrounding the spindle. ~~Balls latter, and also with balls arranged in between[[,]] the spindle and the nut which are arranged in such a way that they the balls can roll in a thread groove formed on the outer surface of the spindle and in a corresponding thread groove formed on the inner surface of the nut. Also provided on the nut are radial~~ Radial through-openings[[,]] are also provided on the nuts. in which deflecting Deflecting pieces are fitted in those openings for the return of the balls respectively from a run-out end of a common turn of the thread grooves to a run-in end of this turn.

The nut is configured as a one-piece sleeve with a circular-cylindrical casing. Each and each fitted deflecting piece is arranged in the associated through-opening of the nut and completely within the outer casing. The through-openings are usually produced by machining. In this process, burr may be produced at the rim of the through-opening, which is not only obtrusive but also may impair

impairs the satisfactory function of the ball screw. In particular, where the rim of the through-opening goes over into the thread groove of the spindle nut, burr can lead to considerable problems. When the deflecting piece is fitted in the through-opening and the rolling ball rolls out of the thread groove of the spindle nut and into the deflecting channel of the deflecting piece, or is pressed in by following balls, the ball it may cant at the burr and block the circulation of the balls.

Please replace the paragraph beginning at page 2, line 6, with the following rewritten paragraph:

SUMMARY OF THE INVENTION

The object of the present invention is to provide a method for producing a spindle nut with which ~~this~~ the disadvantage of the prior art is avoided.

Please replace the paragraph beginning at page 2, line 9, with the following rewritten paragraph:

According to the invention, this object is achieved by a hole punch which is arranged within the spindle nut operative for punching out the through-opening from radially inward to radially outward through the casing of the spindle nut. The outward punching ~~out~~ from inward to outward offers decisive advantages. On the one hand, the effect of a punching draw-in that occurs in punching operations is utilized. This punching draw-in occurs on the workpiece on its surface facing the hole punch. On the finished workpiece, this punching draw-in is manifested as a slight rounding at the punched opening. ~~In the case of~~ the method according to the invention, the punching draw-in is used in a particularly favorable way, in that it is formed on the radially inner rim of the through-opening. This means that, in particular, the rim at the transition from the through-opening to the thread groove of the spindle nut takes the form of a slight convex rounding. This in turn ~~has the consequence that it is ensured~~ ensures that no undesired burr can form in the region of the circulation of the balls, ~~in particular~~ particularly in the transition from the through-opening to the thread groove.

Please replace the paragraph beginning at page 3, line 5, with the following rewritten paragraph:

A further advantage of the method according to the invention is that the cut portion of the punching operation is formed radially on the inside of the wall of the through-opening. The cut portion, which is formed with high precision on the workpiece, permits exact dimensioning of the through-opening to be punched out. This means that the deflecting piece can be ~~satisfactory~~ satisfactorily positioned in the through-opening, and to be precise, can be fitted radially on the inside. The torn-out portion of the punching operation is formed radially on the outside of the outer side of the spindle nut during punching, and that portion takes the form of a slightly conical widening. This effect ~~that occurs~~ can also be advantageously utilized for the purpose of allowing the deflecting piece to be fitted without problem ~~unproblematically~~ into the through-opening from radially ~~the~~ outside on account of the conical widening.

Please replace the paragraph beginning at page 3, line 21, with the following rewritten paragraph:

The punching tool preferably comprises not only the hole punch but also includes a threaded spike~~[[,]]~~ having a ~~the~~ thread profile of which is formed as a negative profile in relation to an inner thread of the spindle nut forming a thread groove for balls ~~[[,]]~~. The ~~the~~ hole punch being is arranged radially displaceably in the threaded spike, and the spindle nut ~~being is~~ arranged on the threaded spike, whereby the hole punch is moved radially outward out of the threaded spike. ~~The fact that~~ Because the spindle nut is arranged on the threaded spike before the punching-out operation allows exact positioning of the hole punch with respect to the spindle nut. This means that, even if a number of hole punches provided in the threaded spike are used, ~~the~~ through-openings are punched at exactly the intended locations after the positioning of the spindle nut on the threaded spike.

Please replace the paragraph beginning at page 4, line 12, with the following rewritten paragraph:

In ~~the case of~~ a ball screw according to the invention, the rim of the through-opening lying on the inner circumference of the spindle nut has a convex rounding. As ~~already~~ described in detail at the beginning, this convex rounding is the result of a punching operation from radially inward to radially outward, and the punching draw-in causing causes this rounding according to the invention. However, other methods by which this convex rounding is achieved may also be provided. According to the invention, ~~it is in any event ensured by this~~ the convex rounding ensures that no undesired burr can be formed in the transitional region of the thread groove of the spindle nut and the through-opening.

Please replace the paragraph beginning at page 5, line 1, with the following rewritten paragraph:

BRIEF DESCRIPTION OF THE DRAWINGS

The invention is explained in more detail below on the basis of an exemplary embodiment that is represented in ~~altogether~~ five figures, in which:

Figure 1 shows a perspective representation of a spindle nut according to the invention,

Figure 2 shows a cross section through the spindle nut according to the invention from Figure 1,

Figure 3 shows an enlargement of a detail of the spindle nut according to the invention from Figure 2,

Figure 4 shows a method for producing the spindle nut according to the invention from Figures 1 to 3 and

Figure 5 shows a ball screw according to the invention in a simplified representation.

Please replace the paragraph beginning at page 5, line 14, with the following rewritten paragraph:

BRIEF DESCRIPTION OF A PREFERRED EMBODIMENT

The A ball screw according to the invention ~~that~~ is depicted in Figure 5. It comprises a spindle nut 2[[,]] arranged on a spindle 1[[,]] and balls 3, which are ~~merely~~ represented here by dashed lines. The balls 3 can roll ~~on~~ along a thread path 4. The thread path 4 comprises a first thread groove 5 formed on the spindle 1 and a second thread groove 6 formed ~~on in~~ the spindle nut 2. The spindle nut 2 is provided with a number of receptacles 7, arranged distributed over ~~the its~~ circumference, for receiving deflecting pieces 8. Each deflecting piece 8 comprises a deflecting channel 9 for ~~the return~~ travel of the balls 3 respectively from a run-out end 10 to a run-in end 11 of at least one common turn 12 of the thread path 4.

Please replace the paragraph beginning at page 6, line 8, with the following rewritten paragraph:

Figure 3 then shows ~~in an enlarged represented the representation of a~~ wall 13 of the through-opening 7. The rim 14 of the through-opening 7 lying on the inner circumference of the spindle nut 2 has a convex rounding 15 at the transition to the thread path 4, and in particular to the thread groove 5 of the spindle nut 2. The part 16 of the wall 13 adjoining the rim 14 is formed in a cylindrical manner or in the form of a slot with mutually parallel wall portions. The adjoining part 17 of the wall 13 is slightly conically widened.

Please replace the paragraph beginning at page 6, line 17, with the following rewritten paragraph:

Figure 4 shows a method for producing the spindle nut 2 according to the invention, ~~that is described above, to be precise~~ in particular the production of the through-opening 7, ~~as it~~ which opening is represented greatly enlarged in Figure 3.

Please replace the paragraph beginning at page 7, line 7, with the following rewritten paragraph:

To produce the through-opening 7, the hole punch or punches 19 are displaced radially outward, and material ~~being~~ is punched out from the spindle nut 2. The punching draw-in that usually occurs on the workpiece in punching operations takes the form here, according to the invention, of the convex rounding 15 described further above on the inner rim 14 of the through-opening 7. Likewise as a consequence of the punching operation from radially inward to radially outward, the cut portion adjoins the radially inner rim, which has already been referred to further above as the part 16 of the wall 13. Adjoining this, the torn-out portion can be seen, likewise formed as a consequence of the punching operation and already referred to further above as the conical part 17 of the wall 13.

Please delete page 8, line 8 through page 9, line 6 (List of reference numerals) in its entirety.